FIG. 1A shows a side-sectional view and a top plan view of an exemplary infrared source according to the invention;

FIG. 1B shows a radiation pattern for the infrared source of FIG 1A;

FIG. 1C shows bar chart illustrating the relative drive power for the infrared source of FIG 1A compared to a standard or conventional source;

FIG. 1D shows a side-sectional view and a perspective view of another exemplary infrared source according to the invention;

FIG. 2 shows another exemplary infrared source according to the invention, having parabolic concentrators and a textured source;

FIG. 3A shows a side-sectional view and a top plan view of an exemplary infrared source according to the invention, having a single bar filament with a behind-the-source concentrator;

FIGS. 3B and 3D show top plan views of exemplary filaments emitters for infrared sources of the invention;

FIG. 4 shows a top plan view and a side elevation view of one exemplary support assembly for filament emitters and reflectors of infrared sources according to the invention;

FIG. 5 shows the exemplary filament emitters for an infrared source according to the invention;

FIG. 6 shows a side sectional view and a top plan view of another exemplary embodiment of an infrared source according to the invention;

FIG. 7 shows spectral irradiance as a function of wavelength for a textured metal foil filament of the invention;

FIG. 7A(a) shows an exemplary mask pattern for an emitter of an exemplary embodiment of the infrared source of the invention;

FIG. 7A(b) shows in detail narrow and broad crosses in the mask pattern of FIG. 7A(c);

FIG. 7A(c) shows the emission spectra of a filament emitter with the mask pattern of FIG. 7A(a);

FIG. 7B shows emission spectra of various exemplary embodiments of an infrared source according to the invention;

FIG. 7C shows the measured and computed emission of an exemplary infrared source of the invention, compared to the ideal blackbody spectrum;

FIGS. 7D and 7D(b) show emission wavelength versus etched cavity size versus cavity-to-cavity spacing;

PAGE 3/4 * RCVD AT 6/1/2006 9:50:51 AM [Eastern Daylight Time] * SVR:USPTO-EFXRF-2/14 * DNIS:2738300 * CSID:617 310 6001 * DURATION (mm-ss):01-38

FIG. 8A of sheet 8/17 of WO 00/07411, and FIG. 8B(a) - 8B(c) illustrate exemplary window frame construction steps for forming individual radiator elements on a silicon die in accordance with the invention;

FIGS. 8A and 8B of sheet 4/17 of WO 00/07411 are duplicative of step 7 and step 10 of FIG. 8A of sheet 8/17 of WO 00/07411;

FIGS. 9A and 9B illustrate conversion efficiency gain for exemplary infrared sensors according to the invention;

FIG. 10 shows an exemplary sensor configuration using an integrated source and detector in an open path atmospheric gas measurement;

FIG. 11A shows in schematic form, and exemplary infrared gas sensor in accordance with the invention, using a single bolometer which emits and detects radiation;

FIG. 11B shows in schematic form, the sensor engine of the infrared gas sensor of FIG. 11A;

FIGS. 11C -11I illustrate in schematic form, additional exemplary infrared gas sensors according to the invention, using separate sources and detectors;

FIG. 12 shows in schematic form, a Wheatstone bridge computer interface for use with driving infrared emitters in accordance with the invention;

FIG. 13 shows in schematic form, a test configuration for use with the Wheatstone bridge interface of FIG. 12;

FIG. 14A shows an exemplary test bed for use with infrared sensors in accordance with the invention and FIG. 14B illustrates a typical data processing stream for data reduction, associated with the test bed for FIG. 14A;

FIG. 15 shows measured data from a pulsed-source and thermopile detector, for gas detectors in accordance with the invention;

FIG. 16 is duplicative of FIG. 9A;

FIG. 17A shows a resolution test patter and FIG. 17B shows a resolution tester for use with devices of the present invention;

FIGS. 18A and 18B show in top plan and sectional views, a 3-element lens system in accordance with the invention;

FIG. 19A shows in schematic form, an infrared mounted in a filter wheel slot, in accordance with the invention; and

FIG. 19B shows three exemplary sources of use with the configuration of FIG. 19A.

PAGE 4/4 * RCVD AT 6/1/2006 9:50:51 AM [Eastern Daylight Time] * SVR:USPTO-EFXRF-2/14 * DNIS:2738300 * CSID:617 310 6001 * DURATION (mm-ss):01-38